

10/591869
IAP12 Rec'd PCT/PTO 06 SEP 2006

SUBSTITUTE SPECIFICATION

MARKED UP VERSION

CLOSURE SYSTEM FOR TUBULAR ORGANS

Field of the invention

[0001] The present invention relates to surgical devices for adjusting the diameter of tubular organs such as the esophagus, the stomach, the colon or the urethra. 5 Such devices may be used as sphincters (e.g. as anal or urinary sphincters) or for the control of obesity. ~~It more precisely~~More particularly, the present invention relates to surgically implantable adjustable rings for encircling said tubular organs.

10

State of the artBackground of the Invention

[0002] Surgical devices for adjusting the diameter of tubular organs have been disclosed in the prior art, for example, are disclosed in patent documents US 5,658,298, 15 US 6,601,604, FR 2 823 663, WO 01/85071 and WO 03/059215.

[0003] TheIn particular, the device disclosed in International Publication No. WO 03/059215 has an open ring shape ~~which~~that comprises a first and second end parts and ~~which~~that is designed to be closed around a 20 tubular organ ~~towards its~~ at the two end parts. ~~by a~~A closure system ~~to adjust~~adjusts the diameter of ~~the~~ said tubular organ by forming the ring into a loop. ~~The~~ The first end part of the ring forming is shaped like a

sleeve having a first and second open end parts and which
and is designed to receive the ~~ring~~ second end part of
the ring, the sleeve main axis of the sleeve being
defined along a direction which that is substantially
5 perpendicular to the main direction of the ~~ring~~ first end
part, ~~the ring~~. The second part of the ring furthermore
comprisingcomprises instead a locking protrusion a hook-
shaped extension that is adapted to hold the border of
the sleeve capture the edge of the second end part of the
10 sleeve, and thereby to secure the ring in a closed
position.

[0004] Summary of the invention

[0005] An object of the present invention is to
15 provide an ~~improved~~ closure system ~~for improved over~~ the
~~previous cited prior art devices~~ in the prior art.
This and other objects of the present invention are
achieved ~~with the device as defined in claim 1.~~ by
providing a surgically implantable ring that can be
20 adjusted in diameter. In one embodiment, a surgically
adjustable ring constructed according to the principles
of the present invention comprises an open ring body that
is designed to constrict a tubular organ and that
includes a closure system having a first and a second end
25 parts.

[0006] The first end part includes a sleeve that has a
first and a second portion and that is designed to
receive the second end part of the closure system. A
locking protrusion extends from the second end part and
30 is adapted to engage an aperture in the sleeve, thereby
securing the ring in a closed position.

Brief Description of the Drawings

- [0007] The above and other objects and advantages of the present invention will be apparent upon consideration of the following detailed description, taken in conjunction with the accompanying drawings, in which like reference numerals refer to like parts throughout, and in which:
- 5 [0008] FIG. 1 is a perspective view of an embodiment of the invention in a closed position; and
- 10 [0009] FIG. 2 is a perspective view of the embodiment of FIG. 1 in an open position.

Detailed Description of the Invention

- [0010] An embodiment of the invention will be discussed in a more detailed way here below together with figures 1 and 2 greater detail hereinafter.
- [0011] Referring to FIGS. 1 and 2, The adjustable ring 1 comprises a closure system having a first end part 3 and a second end part 4.
- 20 [0012] Ring 1 may be manufactured from any suitable material, can be used with the ring 1, e.g. for example, from a biocompatible elastomeric material. The external part of the ring 1 can may be more rigid than the internal part, this latter one having which has an internal diameter which can be adjusted that is adjustable.
- 25 [0013] The firstFirst end part 3 forms is shaped like a sleeve which is designed to receive the second end part 4. The, while second end part 4 has an extension 11 which containscontaining adjusting means, for instance, a wire which can be pulled or pushed in order to adjust the ring 1 diameter of ring 1.
- 30 [0014] The sleeve on first end part 3 has a includes first end part portion 6, which is reinforced by a flange

12, and a second end part portion 7, which contains a holeaperture 5 designed to receive and efficiently retain a protrusion 2, and which is fixed to the ring engages second end part 4.

5 [0015] For the purpose of closing or opening the ring 1, the sleeve second end part portion 7 of the sleeve is provided with an extension forming a defining flexible tab 9. The tab 9, which contains a holeopening 10 situated close to the sleeve holeaperture 5. The presence of the 10 holeopening 10 in the tab 9 provides several advantages, in particular by preventing the accidental opening of the closure system is prevented in situations wherewhen the tab 9 has to support forces, which tend to fold thetending to bend tab 9 in the direction of the 15 extension 11. The Such forces may be due to the movement of the patient, or of the organs of the patient, or to the fluid or bolus passing through the tubular organ.

[0016] The zone-area between both holes 5, 10 aperture 5 and opening 10 is reinforced by a flange 8. The other 20 sides of the tab holeopening 10 are also reinforced by flanges 13, 14.

[0017] The shape of protrusion 2 shape is designed to closely match the shape of flange 8-shape.

[0018] The invention is of course not limited to the 25 above cited exampledescribed embodiment. For instanceIn another embodiment, the holeopening 10 can may be replaced by a portion being that is more flexible than the remaining part of the tab 9. Such a more flexible portion can may be obtained by different wayswith 30 different techniques, for example, in by making the that portion thinner than the rest of tab 9. In still another embodiment, the second portion of the sleeve may

partially overlap the second part of the closure system
when the ring is in closed position.

[0019] The invention can be used for different uses ~~may~~
be advantageously used in a variety of applications, for
5 instance, as a sphincter or as a gastric ring.

Abstract of the Disclosure

[0020] In one embodiment, a surgically ~~surgically~~ implantable adjustable ring (1) comprising ~~comprises~~ a ring body, which includes a closure system having first (3) and second (4) end parts ~~and which~~. The ring body is designed to be closed around a tubular organ ~~towards its two end parts (3, 4)~~ by ~~a~~ the closure system, (2, 5) to adjust the diameter of ~~said~~ constricting the tubular organ by forming a loop. ~~, the~~ The first end part (3) forming ~~is shaped like~~ a sleeve having a first (6) and second (7) open end parts ~~and portions~~, ~~which~~ ~~and~~ is designed to receive the ~~ring~~ second end part (4) ~~of the ring~~. ~~, the sleeve main axis being defined along a direction which~~ The sleeve is substantially perpendicular to the main direction of the ~~ring~~ first end part (3) ~~of the ring~~, and the ~~ring~~ second end part (4) ~~of the ring~~ furthermore comprising ~~includes~~ a locking protrusion (2) adapted to hold the sleeve (3) ~~in position~~, and thereby ~~secure~~ securing the ring in a closed position, characterized by the fact that the sleeve (3) comprises a hole (5) designed to receive ~~said~~ by engaging the locking protrusion (2) ~~in an opening disposed on the sleeve~~.